

I. **Population Estimate of Humpback Chub in Black Rocks.**

II. Principal Investigator(s):

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III. Project Summary:

Robust population estimates are now critical to monitor recovery of the humpback chub population (USFWS 2001). Recovery goals require estimates of population size at regular intervals to measure population response to management activities under the Recovery Program. A population estimate was made for the 1998–2000 time period (McAda 2002). This report summarizes the work begun towards a second estimate of population size for humpback chub in Black Rocks.

IV. Study Schedule: FY 2003 to FY 2005

V. Relationship to RIPRAP: Colorado River Action Plan: Mainstem; V.C. Estimate humpback chub populations; V.C.1. Black Rocks

VI. Accomplishment of FY 2004-FY 2005 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Sampling for this study is conducted in September and October; therefore sampling overlaps two fiscal years. Sampling in calendar year 2003 overlapped into FY 2004 and sampling in calendar year 2004 overlapped into FY 2005. Data analysis for 2003 was conducted in FY 2004 and data analysis for 2004 and the final report will be completed in FY 2005. Therefore, this report will be segregated into calendar years 2003 and 2004.

Fall 2003

Four sampling trips were conducted in September and October. The last sampling trip was made during the final week of October.

Electrofishing was used more heavily than in the past. The entire Black Rocks reach was sampled with electrofishing during one early morning and one evening of each trip. This meant that trammel nets could not be set for those time periods. Electrofishing did capture quite a few roundtail chubs and a few humpback chubs. Also different sizes of trammel nets were used to attempt to minimize stress to the fish and capture a different size of fish. Trammel nets with 0.5-in inner mesh were used with mixed results. Smaller fish were collected, but catch rate was considerably less than with 1-in inner mesh. Fewer nets were set overall to minimize the time between net checks. Attempts were made to keep net sets to 1 to 1.25 hr long, which met that fewer nets could be run at one time.

A total of 70 individual humpback chubs were captured during the investigation. Five of those fish were subsequently recaptured; one within the same sampling rotation and four in different sampling rotations. In addition, twelve of the humpback chubs captured had been tagged in previous years.

A population estimate for 2003 was calculated and presented at the September Workshop. The estimates for different models calculated from program capture are presented below. Confidence intervals were wide and the coefficient of variation (CV) and p-hat were not what were desired under the recommendations for population goals developed by the Fish and Wildlife Service.

Model	Estimate	95% CI	CV	P-hat
Mo	478	221-1,176	0.46	0.04
Darroch Mt	450	211-1,093	0.46	0.04
Chao Mt	365	184-834	0.42	0.05
Chao Mh	597	259-1,538	0.50	0.03
Chao Mth	475	210-1,244	0.50	0.04

#### Fall 2004

Four different sampling trips were made in fall 2004 — September (14–17; 27–30) and October (12–15; 26–29). Sampling protocol was similar to 2003. Sampling was primarily done with trammel nets set for 1 to 1.5 hr periods. However, electrofishing was used at least twice during each sampling trip to capture smaller chubs and to sample areas that could not be effectively sampled with trammel nets. Most humpback chubs were captured with trammel nets. Electrofishing was most effective for roundtail chubs, but some humpback chubs were collected.

A total of 74 humpback chubs were captured, with only one of those fish recaptured within the study period. However 22 of those fish were recaptured from previous years. The poor within-year recapture rate resulted in very poor population estimates using program CAPTURE, with very wide confidence intervals and very low  $\hat{p}$  values. The estimates are presented below.

Model	Estimate	95% CI	CV	P-hat
Mo	2,056	457-10,355	0.69	0.02
Darroch Mt	1,757	403-8,695	0.96	0.01
Chao Mt	932	307-3,244	0.98	0.01

The poor recapture rate resulted in very poor estimates which are not reliable. As a comparison, one additional recapture was added to the matrix and the estimate was recalculated-- all estimates decreased by about one-half.

Total number of fish collected and mean catch per effort were about the same between fall 2004 and fall 2005 so it is very unlikely that the population size changed very much. Even though the estimates themselves are very different, the very wide confidence limits show no significant differences between years.

The high incidence of recaptures from previous years, suggests poor sampling efficiency at Black Rocks which is clearly indicated with the poor  $\hat{p}$  values.

Size structure was similar among years, with a slight shift to larger fish in 2005 (Appendix).

This project is behind schedule. The final report was due in calendar year 2005. A draft final report will be provided to the Propagation Coordinator no later than March 31, 2006.

VII. Recommendations: Complete report writeup as described in scope of work.

II Project Status: Project is ongoing and on track

IX. FY Budget:

A. Funds Provided: 45,100

B. Funds Expended: 45,100

C. Difference: -0-

D. Percent of the FY 2005 work completed, 75%

E. Recovery Program funds spent for publication charges: -0-

X. Status of Data Submission: PIT tag numbers and data associated with stocked fish have been submitted to the data base. Catch data will be submitted March 2005.

XI. Signed: Chuck McAda 12/10/06

APPENDIX:

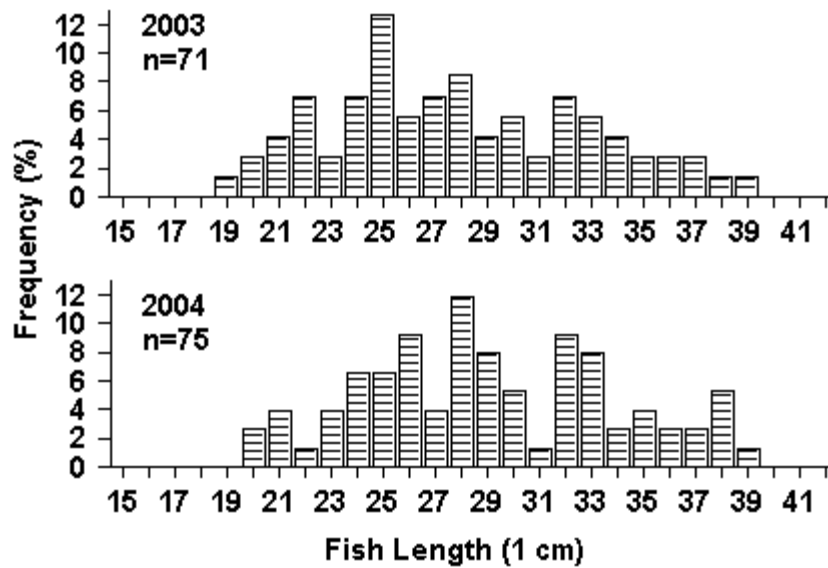


Figure 1. Size structure of humpback chub in Black Rocks, fall 2003 - fall 2004.